MicroBooNE Analysis Tools Update
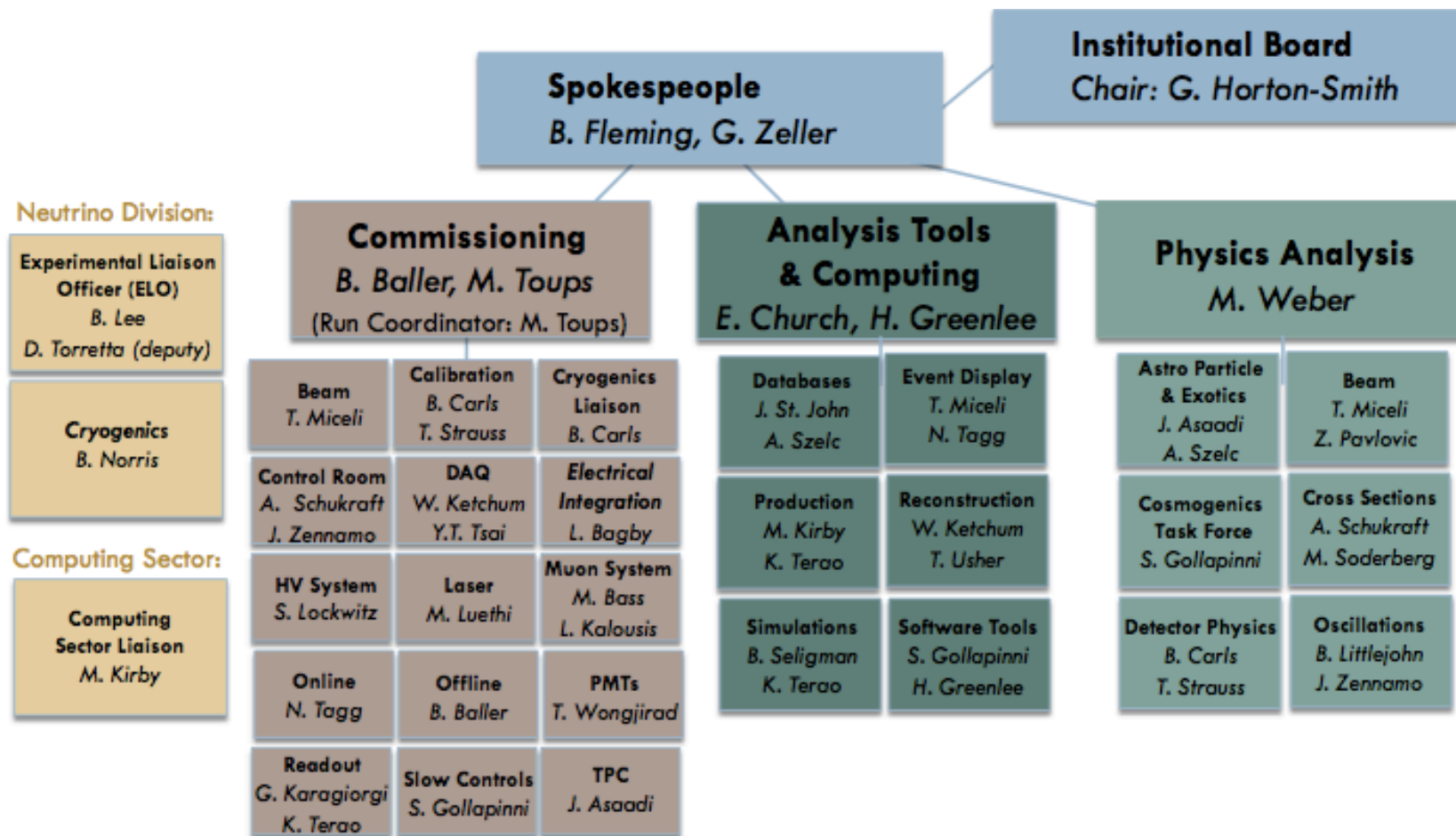
Herb and Eric

30-July-2015

Outline

- Developments since 2 months ago

- General Tools news

- Toward project-izing the Analysis Tools
  - Papers as final milestones

- Sim & Reco summaries – time permitting

Org chart

Personnel/box news

- Katherine Woodruff is now cutting the weekly uboonecode releases.

- MC Production and Data Management have been merged into one box: "Production." Run by Mike Kirby and Kazu Terao.

  - They, needless to say, have a ton going on now.
  - PUBS stacks of projects for MC and for Data are functional and running now, though always being tuned.

  - Next up: Data Quality Management
    - DQM meetings are Mondays, _____. Seeking help to come and contribute in a meaningful way, with a non-heavy-learning-curve to "write a project" that does some aspect of DQM. Python! Nobody does not like python.

Broader Tools News

- LArSoft Intro Class
  - https://indico.fnal.gov/conferenceDisplay.py?confId=9928
  - Full, but sign up anyway; they'll open another wing on the ballroom

- Latest LArSoft is now v04_17_00
  - art v01_15_01
  - Our Optical Reco (Flash creation) working
  - CCTrackMaker suite revamped

- MCC6.1 status
  - LArSoft v4_12_00
  - http://www-microboone.fnal.gov/at_work/AnalysisTools/mc/mcc6.1/
    - All but a few cosmics samples complete
    - Not declared to SAM or moved to dropbox yet, but are available on pnfs (dcache), as directed in "mergeana" column at above mcc6.1 website.

- Oh, and we have data now. PUBS daemon is **on**. (More later.)

Tools *qua* tools, cont'd

- uboonecode, LArSoft now hosted at /cvmfs/uboone.opensciencegrid.org, along with /cvmfs/fermilab.opensciencegrid.org
  - No longer hosted at oasis.

- Andrzej has resuscitated LArForum at Manchester
  - (insert inflatable palm tree, disco, silk shirts joke here)
    - *www.larforum*.org/forum

- We have a new, persistent 15 Pbyte non-tape backed dcache disk area.
  - /pnfs/uboone/persistent/

- Herb has resurrected continuous integration and has worked heavily on unit tests. It is imperative before claiming your code is ready for release (pushing) to do:
  - mrb test –j4
  - setup lar_ci; test_runner uboone

  This would have caught recent checked in failures.

Tools, cont'd 2

- Analysis frameworks
  - ERTool
    - used extensively by the Shower reco people, though not confined to that work
  - AnalysisTree
    - A LArSoft output TTree, not a framework
  - BNL framework for studying wire-cell reco
    - Will hear perhaps a little about this today in Chao's talk
  - People will code as they desire. All hangs off of (is downstream of) data gen'd/processed/reco'd by LArSoft. There has been some discussion that we oughta take a day and have a "retreat" and show the pro's/con's of each analysis framework.

PUBS

- No tool is more massive than PUBS
- It drives MCC, data management. It will be the backbone of DQM. It will soon be making you yer latte in the morning and driving the unmanned car next to you on I88.
- There is a pubsmon gui now that watches over PUBS itself: see Kaleko's docdb 4497
- PUBS needs to be bundled into ups: docdb 4424
  - After which we hand it off to SCD::OPOS (Offline Production and Operation Service) when we're ready, and they'll run our processing for us.
  - Additionally, see 4424 for integration of PUBS+project.py

Some PUBS projects

- Data swizzling (.ubdaq files => .root files) is performed by one pubs project. **As of last week it works and is running in realtime with the rest of PUBS**. (Please ignore previous claims to such.) Still being tuned.
  - There were some metadata problems due to shifting DAQ development, FEM slots, and handling file trailer.
- There is a new PUBS project that pushes data to PNNL for backup: docdb 4543.
  - And registers new location with SAM; will then be able to process on the PNNL nodes; pending Cert/proxy issues being solved …

Projectizing our Reconstruction

- Motivated by some confusion at the latest PAC about where MicroBooNE reco stands and at the stern urging of the Spokes, we have begun to Projectize the MicroBooNE Reconstruction. There is a general sense that it would help everyone to get our house in order, and to know where our bottlenecks are and where work is needed to get papers out.
  - Much headway was made at the Convener's retreat a few weeks ago.

Projectization

- Michele has some nice diagrams that show diagrammatic relations among necessary tasks and tools to get first papers out.

- We now have a Redmine Gantt chart that shows atomic AT tasks, and *will* link issues all the way to papers as milestones. Meant to map onto the AT org chart. Names/deadlines not yet there. https://cdcvs.fnal.gov/redmine/projects/uboone_at_planning/issues/gantt.

- We should mate Michele's diagram together with the Redmine Gantt chart somehow.

Gantt chart

uBooNE Offline

Planning

Task #9403: Analysis Tools

Task #9406: Simulation

Task #9421: Generators

Task #9445: Single Particle

Task #9447: Neutrino

Task #9446: Genie

Task #9448: Cosmic ray

Task #9450: CRY

Task #9557: CORSIKA

Task #9422: Geant4

Task #9425: Optical Simulation

Task #9424: TPC Simulation

Task #9451: Electron drift

Task #9452: Recombination

Task #9453: Birks

Task #9454: Box

Task #9455: Bulk effects

Task #9456: Drift velocity

Task #9457: Electron lifetime

Task #9458: Diffusion

Task #9459: Electric field di...

Task #9469: Geant4 configuration

Retreat

- We propose a full-day retreat in August with AT conveners and Michele to try to identify status of tools.
  - Doodle poll out
  - PT conveners in next iteration

- Then, with Physics Conveners we will define results as milestones. We will connect the network of tasks, with a milestone at a far right node.

- People say this kind of thing is useful.

Time Permitting

- Sim and Reco Updates in next slides

Simulation since last collab mtg

- Optical Sim Improvements (Taritree: docdb4402)
  - Handles the High/Low 2xTriggerType – 4 copies Readout.
- Event Reweighting (Zarko/Corey: docdb 4486)
  - LArSoft module to accommodate BNB nue, HARP pi+ weights, GENIE parameter-twiddling
- Geometry v7 (Glenn: docdb4426)
  - Fixes too much Lar hanging off end of cryostat, overlaps, too much stainless steel
- GENIE discussions (Steve: docdb 4485,4436)
  - V2.10.00 config features.
  - GENIE standalone: whoda thunk it?!

Reco News since last collab mtg

- Optical Reco Performance (Wes, docdb 4531, Kazu/Nicky, docdb 4513)
  - Flash-Track matching in intense current R&D, charge weighted "cm" tracks to bright Flashes does well. More advanced things in mind.
- Cosmic subtraction
  - Andy, docdb 4416: Pandora tracklike particles give 96% rejection above 15cm
  - Tracy, docdb 4393: mcc6 tracking-based performance talk=> Similar (slightly better) rejection.
  - Christoph docdb 4559
  - Ben C and Sara, new code pushed.
  - Bruce just pushed PFPAna that we think makes the plots of Andy+Tracy.

Reco News continued

- Bruce just pushed a whole new CCTrackMaker package in LArSoft v04_16_00 we're keen to hear about that tackles those problematic shorter tracks
- Track direction from MCS (Leo, docdb 4418)
  - Assigns proper direction 95% of the time to contained tracks.
- Track direction from dQdx, as in Michels in docdb4581 (V. Gentry, K. Sutton)
- Wes docdb 4562 cosmic overlays
- Wire-Cell reco to remove flat track degeneracy (Chao/Xin, docdb4494,4457 + this mtg!)
- Shower Reco Workshop
  - A lotta people gaining ERTool skills. Problem is hard. Updates coming.